



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/701,587	11/30/2000	Hans Peter Rath	49091	5855
26474	7590	08/11/2006		
NOVAK DRUCE DELUCA & QUIGG, LLP 1300 EYE STREET NW SUITE 400 EAST TOWER WASHINGTON, DC 20005				
			EXAMINER LU, C CAIXIA	
			ART UNIT 1713	PAPER NUMBER

DATE MAILED: 08/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/701,587	RATH, HANS PETER	
	<b>Examiner</b>	<b>Art Unit</b>	
	Caixia Lu	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 12-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Request for Continued Examination***

1. The request for continued examination (RCE) under 37 C.F.R. §1.114 is acceptable. An action on the RCE follows.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claim 12-27 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
  - (i) In claims 12 and 27 respectively, the term "average molecular weight" is indefinite since the type of average molecular weight is not specified. Is it a weight average molecular weight or a number average molecular weight or something else.
  - (ii) The used of term "obtainable" in line 3 of claim 27 renders the claim ambiguous because it is not clear whether the polymer is actually obtained by the method of the claim.

### ***Claim Rejections - 35 USC § 103***

5. Claims 12-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rath (US 5,408,018).

Art Unit: 1713

The instant claims are directed to a cationic polymerization process for preparation of a polyisobutene having a terminal vinylidene group content of more than 80 mol% and average molecular weight of 500-5000 in the presence of a complex comprising boron trifluoride, a primary or secondary alcohol, and a secondary ether containing no tertiary alkyl groups, wherein the molar ratio of alcohol to ether is 0.01:1 to 1:1, and the molar ratio of the sum of alcohol and ether to boron trifluoride is more than 1 and less than 2.

Rath teaches a process for preparing polyisobutene with a content of terminal vinylidene groups of more than 80 mol % and average molecular weight of 500-5000 in the presence of a complex comprising boron trifluoride, secondary alcohol, and dialkyl ether (col.4, lines 44-57). Rath further teaches that the dialkyl ethers can be symmetrical and unsymmetrical C<sub>2</sub>-C<sub>20</sub> dialkyl ethers and the exemplified alkyl groups are methyl, ethyl, n-butyl, isopropyl, isooctyl, 2-butyl, t-butyl, etc. (col. 7, lines 61-65, col. 8, lines 30-42, and col. 13, line 17). The dialkyl ethers with alkyls such as isopropyl and 2-butyl are secondary ethers.

Rath's Examples 6, 7 and 8 teach polymerization processes for preparation of a polyisobutene having a terminal vinylidene group content of more than 80 mol% in the presence of a complex comprising boron trifluoride, 2-butanol, and an ether of 2-butyl tert-butyl ether or di-n-butyl ether, wherein the wherein the molar ratio of alcohol to ether and the molar ratio of the sum of alcohol and ether to boron trifluoride are in the ranges of the instant claims. The isobutene polymer of Example 6 has an average number

Art Unit: 1713

molecular weight of 1065 and terminal double bonds of 92% which meets the limitations of claim 27.

It is noted that Rath teaches that the tertiary alkyl group containing ether is preferred, however, Rath's dialkyl ethers are not limited to the tertiary alkyl group containing ether. As shown above, Rath's dialkyl ether includes symmetrical dialkyl ether where the alkyl can be 2-butyl or isopropyl group and diisopropyl and di-2-butyl ether meet the dialkyl ether limitation of the instant claims.

Therefore, it would have been obvious to a skilled artisan at the time the invention was made to employ Rath's teaching to prepare polyisobutenes in the presence of a trifluoride/secondary alcohol/dialkyl ether complex wherein the dialkyl ether is a symmetrical secondary dialkyl ether, such as diisopropyl ether and di-sec-butyl ether (same as di-2-butyl ether) because such within the scope of Rath's teaching and all of the embodiments of the reference are expected to work and in the absence of any showing of criticality and unexpected results.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caixia Lu whose telephone number is (571) 272-1106. The examiner can normally be reached from 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful and the matter is urgent, the examiner's supervisor, David Wu, can be reached at (571) 272-1114. The fax numbers for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1700.



Caixia Lu, Ph. D.  
Primary Examiner